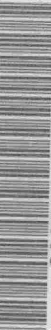


BEVS

STANDARDS DEVELOPMENT BRANCH OMOE



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GASOLINE CONTAMINATION OF A PRIVATE WELL WATER SUPPLY

township of osgoode
concession 7, lot 25

f. r. campbell

1973



Ontario

Ministry
of the
Environment

MINISTRY OF THE ENVIRONMENT

TOWNSHIP OF OSGOODE - CONCESSION 7, LOT 25

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MINISTRY OF THE ENVIRONMENT

TOWNSHIP OF OSGOODE - CONCESSION 7, LOT 25 GASOLINE CONTAMINATION OF A PRIVATE WELL WATER SUPPLY

INTRODUCTION

In response to the complaint of Mr. J. E. Irvine, an investigation was conducted by the Water Quantity Management Branch near the Community of Metcalfe to determine the cause of gasoline pollution of his private well water supply.

Mr. Irvine's well, which is dug to a depth of 4 feet in overburden and drilled to 39 feet in limestone bedrock, began yielding gasoline-contaminated water in mid-August, 1972. The well is located 40 feet downgradient from a 200-gallon gasoline storage tank, which is owned by Gulf Oil Canada Ltd. The tank is suspected to be faulty, and has not been filled with gasoline since the water-quality problem began. No other wells exist in the immediate area, although a new residence is being constructed approximately 350 feet north of the contaminated well and a well is expected to be constructed for this residence.

HYDROGEOLOGY

The study area is located on a drumlinized till plain on which loam soil with good drainage characteristics has been developed. The overburden is reported as being only 4 feet thick and is underlain by

limestone of the Oxford formation.

According to Sobanski,¹ aquifer development in the Oxford formation is highly variable with ground water moving mainly through fractures, joints and bedding planes.

WATER QUALITY

Two samples of the Irvine well water were collected for chemical analyses. The analyses results are presented in Table 1. It can be seen that 3 ppm of gasoline were detected in the well-water sample collected September 18, 1972. No other water-quality problems appear to exist in the Irvine well water supply.

Gasoline, a crude oil distillate, does not occur naturally in ground water. Gasoline in water does not form a hazard to human health as supplies become esthetically objectionable at concentrations far below the chronic toxicity level.

ADDITIONAL STUDIES

At the request of the Water Quantity Management Branch, the Ministry of Consumer and Commercial Relations investigated the soundness of the gasoline storage tank. Mr. MacIver of the Energy Branch reported

¹

Sobanski, A. A., Ground Water Survey, The Regional Municipality of Ottawa-Carleton, OWRC, 1970.

that, from the available information, it would appear that the contamination of the well has been caused by spillage over the past years while refuelling farm equipment at the site. In addition, he advised that the tank has been emptied and will not be used again, that the pump has been removed and that the tank will be removed from the premises entirely in the spring of 1973.

SUMMARY AND CONCLUSIONS

The Irvine well water has been analyzed and found to contain 3 ppm gasoline. Since no other sources of gasoline exist in the study area, it may be concluded that poor gasoline handling techniques have resulted in contamination of the well-water supply. The shallow overburden that overlies the fractured bedrock does not present a barrier to the downward migration of gasoline into the bedrock aquifer. Thus, even a few gallons of gasoline spilled near the tanks could enter the aquifer, move downgradient toward the well and contaminate large quantities of ground water.

ALTERNATE SOURCES OF SUPPLY

Several alternatives are available that can be attempted to restore supplies. These include:

- 1) A deeper bedrock well could be drilled in a remote position upgradient from the former storage

tank location in an attempt to locate an uncontaminated zone that is unconnected to the presently contaminated aquifer. Care must be taken to seal off the upper zone to ensure that the contaminant is not permitted to percolate down the well bore to the lower aquifer. The location of such an uncontaminated aquifer does not guarantee that future contamination of the water supply will not occur.

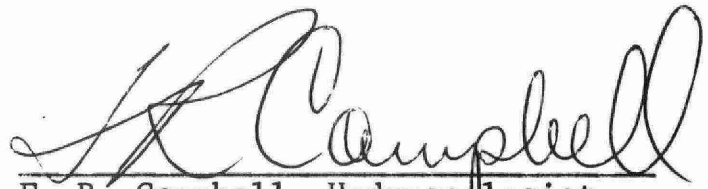
2) The present well could be continuously pumped to waste to remove as much of the contaminant as possible. An activated carbon-diatomaceous earth filter could then be introduced into the system to remove any of the remaining gasoline tastes and odours.

3) Water could be hauled.

RECOMMENDATIONS

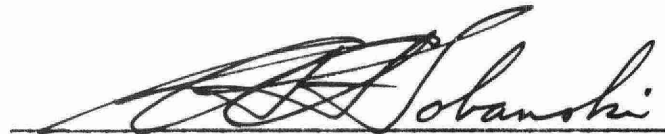
If efforts are made to utilize a gasoline filter, the pressure tank and hot water tank in the residence should be drained periodically and any accumulated gasoline removed. It may be necessary to occasionally flush the entire plumbing system with a strong detergent or caustic solution to remove, if possible, any gasoline which may coat the system. This work should be carried out by qualified personnel.

Report by:



F. R. Campbell, Hydrogeologist,
Surveys and Projects Section,
Water Quantity Management Branch.

Approved by:



A. A. Sobanski, Program Engineer,
Surveys and Projects Section,
Water Quantity Management Branch.

FRC/af

1/6/73

MINISTRY OF THE ENVIRONMENT
CHEMICAL LABORATORIES
ORGANIC ANALYSIS

All analyses except pH reported in
mg/litre unless otherwise indicated

Municipality: Metcalfe

Report to: J.R.Campbell, Water Quantity Branch

c.c. Central Files

Source: Well- Mr. J.E. Irvine, R.R.#3, Metcalfe
Spills and Complaints

J.G. Clarke, Ind. Wastes Branch,
2378 Holly Lane, Ottawa, Ont.

Date Sampled: Sept. 18/72

by: Mrs. Irvine

P. Diosady
G. Rees

Lab. No.	Gasoline												
0-1028	3.0 ppm												
0-1028	1 & 2	Grab from well	7.30 a.m.										

WATER QUANTITY
MANAGEMENT BRANCH

SEP 28 1972

MINISTRY OF THE
ENVIRONMENT

MINISTRY OF THE ENVIRONMENT.

CHEMICAL LABORATORIES

WATER ANALYSIS

All analyses except pH reported in
mg/litre unless otherwise indicated

Municipality: Metcalf		Report to: F. Campbell		6-40 ✓		c.c. Supervisor of Water Works					
Source: Water well - G.W. Pollution		P. Diosady		Central Files							
Date Sampled: Oct. 4/72		by S. Sisson									
Lab. No.	Hardness as CaCO ₃	Alkalinity as CaCO ₃	Soluble Iron as Fe	Chloride as Cl	pH at Lab.	Fluoride as F	Apparent Colour Units	Turbidity Units	Sodium as Na	Potassium as K	Calcium as Ca
W40-127	348	327	-	83					61	1.6	91
	Magnesium as Mg	Sulphate as SO ₄	NITROGEN AS N			Total Phosphorus as P	Petroleum Identification	Conductivity in micromhos per cm			
			Free Ammonia	Total Kjeldahl	Nitrite	Nitrate					
W40-127	29	30	<.01	.27	.043	.81	-	*		919	
<p>* Analysis of sample by G.C. indicated the presence of trace amounts of petroleum product type residues. Sample, however, contained insufficient material for positive identification.</p>											
W40-127	<p>1. Levin Irvine</p> <p>NOV 1 1972</p>										